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SOME GUESTS AT THE BANQUET OF BLOSSOMS.*

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In 1905, my first season of collecting, I went over to England at the end of June on a botany trip. I had already begun to watch for beetles on blossoms before leaving Canada, though my chief hunting-ground had been the bark of trees. In England I knew that the latter game-preserve was practically out of the question, as timber is far more scarce, and nearly all the woods are kept too clean for fallen timber to lie or wood to rot. If I meant to do any beetle-hunting, it must be by some other method, and I naturally made up my mind to combine hobbies by carrying a collecting-bottle out with me on my daily botanical rounds.

My first stay was on a small estate in Chislehurst, Kent. Here, in this garden within a garden, while wandering through a wood of hazel and oak I came on a large clump of tall umbellifers in full bloom. I knew already from Fowler's and other books that such blossoms were a favourite haunt of certain beetles, and I made my way cautiously along a hedge of rhododendrons towards the clump. As I did so, there rose from between my feet a dark brown hawk-like bird, that flew up into my face and hovered for some moments in front of me; it was a nightjar, the famous goat-sucker of popular superstition, menacing, but powerless to fulfil a threat, being, indeed, cousin-german to our night-hawk and whip-poor-will, with all the furtive movements and ghostly silence of the creatures that fly abroad by night and hawk beneath the light of the moon. Like the night-hawk, it builds no nest, but there among the round flint pebbles by an oak lay its pair of eggs.

When first I got to the clump of flowering plants and scanned their broad white discs of blossom, among numerous diptera and hymenoptera, nothing was to be seen except a few butterflies, but presently I saw a large black and yellow Longicorn settle on an umbel some distance off. On approaching I found two of the beetles feeding and succeeded in catching one in my hand. They were very active, as quick as sunflies and almost as wary, so that capture was far from easy. I managed, however, to get a

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second specimen some time after. They proved to be *Strangalia armata*; later on in the season I captured in North Wales a pair of *Strangalia melanura*, one on a composite, the other on a small umbellifer; and in Somerset, on the slopes of the Quantocks, I captured the more rare *Strangalia quadrifasciata*, sunning itself on a hazel leaf. The genus *Strangalia* is closely related to the *Leptura*, and, like that genus, with its near allies frequents blossoms. So far I have not found any in Canada, though some species are, I believe, not uncommon. From the wood I passed into the kitchen garden, for I remembered a bed of orpine or livelong (*Sedum telephium*) where, 25 years ago, I could be sure of some Red Admirals (*Pyrameis atalanta*) and an occasional Peacock (*Vanessa io*), but alas! King Orpine's days were numbered, and Salpiglossis and Montbretia reigned in his stead. However, I spied a bed of asparagus and went over to review its ranks. I soon found that ladybirds were glutting themselves on a small dark grub about the foliage; it was probably the grub of the asparagus beetle (*Crioceris asparagi*), for I found a number of the mature insects on the leaves. Though very small, this beetle is extremely beautiful when alive, the vertical lines and cross-bars which appear black in cabinet specimens being of a rich dark green in the living insect. It has a curious habit when alarmed of thrusting its antennæ straight forward in front of the head and remaining motionless like a pointer; this habit is found in not a few of the Chrysomelians, as in some of the Longicorns, notably the Saperdas. I saw no trace of the 12-spotted species (*Crioceris 12-punctata*); indeed, at the time I did not know it occurred in Great Britain; but in September, 1907, I found both species on some asparagus in the late Dr. Brodie's garden in Toronto, and the last two years I have found the latter species abundant in Port Hope. In Dr. Bethune's day, I understand, it had not yet appeared there.

During the rest of my stay in England I did not do much collecting, as the month of August forms a sort of interregnum in insect activity between the early and the late broods. But I returned to Canada fully determined to prosecute my search among flowers and foliage in the coming season. I knew, of course, that I should thereby restrict my captures mostly to two or three families of beetles—the Scarabs, Longicorns and Chrysomelians, but from some such form of amateur specialism I was not at all averse.

Accordingly, from early April in the spring of 1906, I was out and about whenever I got the chance. It was not till May that my efforts met with much reward. A species of *Cedemeris* that frequents the dogtooth

violet was almost the only capture. I had been told that a somewhat rare Longicorn was to be met with on the blossom of the trillium, but my informant could not tell me its name, nor did patient search in trilliums yield me any specimen of this family. About the 20th of May, however, blossomed the early elder, and though I wasted a great deal of time over elder clumps growing far away from woodlands, I did at last, by good luck, direct my steps to some growing on the edge of a wood about four miles north of the school. Here I found a new species of Scarab, leaden-gray in colour, though disguised for the nonce in a light yellow coat of pollen, with which it was thickly dusted over; it had long crooked hind legs that looked too clumsy to be of much use to their owner, and were, indeed, trailed along after it when it crawled. It was the male of *Hoplia trifasciata*, and I found it abundant for two or three weeks on the early elder, the choke-cherry and the hawthorn; at first only the males were to be found, but about a week later the females became common; these at first I took for a distinct species, as they are very different in colour, yellowish-white, with three irregular bands of brown across the back; on the hawthorn, however, where the female was in preponderance, I more than once found a pair. The same mistake appears to have made its way into print, and the two sexes were at one time assigned to distinct species, the male figuring as *Hoplia tristis*, and the female as *Hoplia trifasciata*. I found also on this clump of elder a few specimens of one of our earliest Lepturas, *L. ruficollis*; and, by way of a new illustration to the old adage that "it never rains but it pours," three specimens of what at first I took to be an ant, till on looking closer I saw the straight line down the back formed by the suture of the wing-covers and the gracefully curving antennæ that mark the Longicorn beetle. It was quite new to me, and my fellow-collector, though several seasons older than I, had nothing like it in his collection. There was nothing specially remarkable about its colour, which was blackish or dark gray, relieved by some transverse pencilled lines of white, and it was only $\frac{1}{2}$ of an inch in length, but there was an elegance of form and outline that made it long a favourite in my little collection. This enthusiasm in a grown man doubtless seems absurd to the uninitiated, and I must admit, somewhat ruefully, that I found myself an object of pity rather than envy when I "talked beetles" to a brother of mine who has misspent the last 20 years of his life tiger-hunting in Madras and bagging lions in Rhodesia, in fact, generally making ducks and drakes of all his golden opportunities to collect rare Longicorns from tropical blossoms.

In the identification of this insect occurred an episode that I hope Dr. Bethune will pardon me for introducing here. At the close of this season of 1906 I purchased a copy of LeConte & Horn's key to the genera of N. A. Coleoptera. By a somewhat rough process of elimination I had decided my beetle belonged somewhere in the tribe *Clytini*, whose most familiar representative is probably the famous sugar-maple borer, *Plagionotus speciosus*. LeConte & Horn's book made it probable that in the third group of this tribe, the *Anaglypti*, it would find its place. This group contains four genera, *Microclytus*, *Cyrtophorus*, *Tillomorpha* and *Euderces*. Only one of these genera was at all known to me, and that from a single species (*Euderces picipes*) somewhat resembling the subject of my examination. I found first of all that the beetle I was trying to place had no ivory marks on the elytra, which put *Euderces* out of the question; the eyes were oblique and emarginate instead of round, which excluded *Tillomorpha*; it must be either *Microclytus* or *Cyrtophorus*, and the book gave me no choice, for in *Microclytus* the second joint of the antenna was equal to the fourth, while in *Cyrtophorus* the second joint was much shorter, as it obviously was in my specimens. My fellow-collector had already sent a box of unidentified specimens to Guelph to be named, and when they came back I was naturally eager to learn the result. To my chagrin I found my little favourite christened *Microclytus gazellula*. This so mystified me that at last I wrote to Dr. Bethune, explaining the quandary I was in. To my great relief I got an immediate reply, that the beetle sent him had been identified from a cabinet specimen named by an older collector. LeConte & Horn were right, my beetle was *Cyrtophorus verrucosus*, as were those in the Guelph cabinet, though hitherto wrongly named.

I have examined a number of cabinets, and in none of them yet have I found more than an odd specimen of this beetle, nor have I met a Coleopterist who had captured it, except accidentally, as it were. But on the blossoms of the early elder, still more those of hawthorn, sometimes of choke-cherry, dogwood, spiked maple, viburnum and New Jersey tea, from the middle of May till early in July, I have found it abundant. It is then replaced by its near relation, *Euderces picipes*, which frequents blossoms all July, especially those of New Jersey tea and milkweed, though often met with also on certain of the rosaceæ and composites. It closely resembles *Cyrtophorus*, though considerably smaller and not so elegant in form; on the side of each elytron is a transverse white band, technically termed an ivory vitta; in the first specimens captured I did not recognize a new kind till I took them out of the killing-bottle.

This finding of a new species acts as a great incentive to the collector; not merely through the stimulus and encouragement of filling gaps in his cabinet, but through the interest and education of comparing closely-allied species and genera, and gradually following out the relationship of distinct tribes as the series of intermediate forms grows more and more continuous; thus retracing, as it were, the steps of natural evolution. It was, I know, a great encouragement to me to find the wide gap between, say, the Cyllenens and the Lepturas being gradually filled in and the various stages of the transition emerging, so to say, from the unknown. I believe it was the consequent redoubled efforts made by my fellow collector and myself the next season, more than mere luck, that brought us an interesting discovery in the middle of June. On a certain Sunday morning I captured on spiked maple a specimen of an ant-like beetle, obviously belonging to the *Anaglypti* group, but neither *Cyrtophorus verrucosus* nor *Euderces picipes*, and in the afternoon of the same day on hawthorn my friend captured a specimen of an ant-like beetle neither *Cyrtophorus verrucosus* nor *Euderces picipes*. Neither of us noticed his discovery till we came to turn out the contents of our killing-bottles on returning home. Stranger still, the new species we had captured, when we came to compare notes, proved different from one another. By a close examination of my friend's capture, I found he had at last got a genuine specimen of *Microclytus gazellula*. My capture has not yet been identified, but it may be referred almost certainly to the genus *Cyrtophorus*.

I have been led into something of a digression here, and for purposes of this paper I may remind you that we are in the month of May, and searching for beetle guests on the blossoms of the early elder. Through the middle of the wood where I made these first discoveries flows a small stream that has eaten out for itself quite a deep ravine through the limestone clay and marl. About 100 yards up this glen grows a large shrub of early elder that opens about the end of May; on its blossoms we got several more of the *Leptura ruficollis*, but nothing new that season. In 1907, however, while my fellow collector was examining the blossoms, he spied a new Longicorn, of which he captured three specimens, and a day or two later, from the same shrub I managed to get two. Though there were several other elder bushes in the wood, we have found this beetle on none of them, only on this one tree, and it has yielded us from three to five specimens every season since. As far as our experience goes, the beetle is active from the end of May till nearly the end of June. In 1907, from another locality I took two specimens on dogwood blossom;

in 1908 I got three or four specimens on dogwood and on the thimbleberry, and in the season just over we both saw specimens feeding on hawthorn blossoms. It is the *Pachyta monticola*, a very pretty insect with pale yellow elytra, boldly marked with black or deep crimson. This genus is closely related to the Lepturas, but broader across at the base of the elytra, and thicker through the sternum; its thorax, too, instead of being rounded at the sides, is armed with an excrescence known to Coleopterists as a "process." In 1907 and 1908 I succeeded in capturing a few specimens of two more species of *Pachyta*, smaller than *monticola*, and inconspicuous in colour, black, or black with dark brown streaks on the wing-covers. They were taken late in June, feeding on the blossom of a dogwood. And with every fresh discovery I swelled with pride as I found myself getting more and more intimate with this royal family among beetles, the Longicorns.

With the passing of May the early elder came to an end, but before it was over the hawthorns began to bloom all over the neighbourhood. Our first field of investigation *was* a field, an extensive pasture bordered on one side by a wood of pine, beech and maple. At first I went all about the farther end of the field wherever the snowy mass of a hawthorn bush in full bloom drew me, but I soon found that it was only near the wood that my search was rewarded; the first captures were a couple of Scarabs called *Trichius piger*, a beetle looking very much like a small bumblebee and extremely active; it is abundant on blossoms from early in June till the middle of July, and may be found on a great variety of flowers. Then I got my first specimen of *Dichelonycha elongata*, another Scarab, which is particularly fond of basswood foliage, and becomes some seasons a veritable plague. Finally I came to hawthorns on the border of the wood, and here I found several Longicorns feeding. Among them three Lepturas that were new to me, *Leptura pubera*, *L. mutabilis* and *L. vibex*, of the last two only a single specimen. About the same date I paid a visit to the wood four miles away, to see what guests the hawthorns there were entertaining. On one bush at the edge of the wood I found both sexes of *Hoplia trifasciata* plentiful, two or three specimens of *Dichelonycha*, and a lot of *Leptura ruficollis* and *Cyrtophorus verrucosus*; and besides these a new insect that at first I passed over for a fly, till the long antennae betrayed it; these in the female were about the length of the body, in the male twice as long; it was the more easily mistaken for a fly in that its wing-covers were reduced to a mere pair of epaulets or shoulder pads. It proved to be the Longicorn *Molorchus bimaculatus*,

and was very abundant throughout June on several sorts of blossom. On another bush at the edge of the wood I found a regular colony of Chrysomelians busy in the blossoms. I sent three of these to Guelph, where they were identified as varieties of *Orosodacna atra*; in June, 1907, I found the same beetle on hawthorn blossom at Lakefield, and I have taken it also on viburnum; in no case did I find the normal form of *O. atra*, though a few of my specimens approximated very closely to it.

A curious feature about the hawthorn and its guests is that some shrubs apparently as favourably situated as others and in full bloom, were deserted and others crowded. It may prove that some species attract beetles and others do not; Gray's New Manual enumerates 65 species of hawthorn in N. A., while in Sargent's Monograph on the *Cratægus* in some parts of Ontario alone (as published in last year's Wellington F. N. Bulletin), no less than 95 species are distinguished. The results of closer determination in the species of plant hosts might prove interesting.

An encouraging thing about this sort of collecting is that seasons vary in the maturing of both hosts and guests, so that often you will find species frequenting blossoms that the year before they did not visit, and sometimes you will come across an entirely new insect. Two seasons ago, for instance, early in June, we found a strange beetle abundant on dogwood; it proved to be *Callimoxys*, a first cousin of *Molorchus*; in this genus the wing-covers are not short as in *Molorchus*, but awl-shaped, so that the inner margins do not lie together in a straight line. Again this last season I made a new find on hawthorn in the shape of a small oak-pruner (*Elaphidion*). Much, too, may result from search in a new neighbourhood; in 1906 I found scores of *Lebia furcata* (a small Carab of the Bombardier group) feeding on golden-rod about the margin of a swamp at Lanark, and last July I captured two fine specimens of the large blister beetle, *Pomphopæa Sayi*, in Muskoka, upon nannyberry (*Viburnum lentago*).

When the hawthorn began to bloom in 1907, I went eagerly back to work my claims, for the bloom of a hawthorn lasts barely a week, and seems to attract insects for only a day or two. I had already ruled out the shrubs growing in the open; so I went first to the edge of the wood, but this faced west, and was exposed to a chilly wind. There was nothing to be found, and I followed the gleam of hawthorn north across some stump lands to a large wood; skirting its west and north border, I came presently to a stretch of low swampy ground that penetrated the wood in a southerly direction, and was entirely out of the wind. It was thickly grown with dogwood and spiked maple, both of which were in the prime

of their bloom, and in full sunshine. The number of insects feeding on the blossoms was astonishing; in an hour or two I must have captured several hundred beetles. Besides *L. ruficollis* (with its variety *sphaericollis*), *L. vibex* was plentiful, and so was *L. mutabilis*, whose name now for the first time became clear to me, both forms being abundant, the light brown and the dark gray; I found also a very small *Leptura* that was new to me (*L. subargentata*), and the beetle, *Encyclops coerulea*; there were also a few specimens of *C. verrucosus*, and it was then that I got my unidentified species of *Cyrtophorus*. There were, of course, other families of beetles; in particular, Elaters, of which I captured four new species, one of which I have never seen except on spiked maple, the head and thorax dark brown, ending in a reddish-brown base, the elytra yellow-green, tipped with dark brown. On the same blossom in another locality I have taken three more Elaters, *Corymbites hieroglyphicus*, *C. propola*, and a third species not yet identified, prettily marked with dark wavy lines across the wing-covers; besides these, yet another *Leptura* (*L. 6-maculata*). *L. vibex* seems fairly to revel in these moist woody hollows, and later on in the same place on black elder I found *L. lineola* abundant. It is evidently addicted to black elder, and partial to moist woodlands.

As June drew to its close we extended our search to the south slope of a long ridge of high land, some 6 miles north of P. H. On this slope grew the New Jersey tea, and as there were many groves of standing timber, as well as berry patches and thickets of small trees and shrubs, we felt confident that we should make some finds. Our first visit to this place (which we dubbed "the Rocky Mountains") found the New Jersey tea still some days short of blossoming, but there was dogwood in bloom on the slopes, and almost the first bush we visited brought us three or four new beetles, among them *Gaurotes cyanipennis*, of the Lepturoid group, a stout, robust beetle, resembling in form *Pachyta monticola*, very handsome and of a brilliant dark green hue, and *L. capitata*, a beetle we at first took for *ruficollis*, but more tapering in outline, and with head crimson as well as thorax.

With the first days of July, along the southern slope of our local Rocky Mountains the New Jersey tea and late elder expanded to the sun, and the whole hillside became a revel of insect life. The delicate fragrance of the New Jersey tea would no doubt at any time attract guests to its dainty white clusters, but coming, as its blossoms do, jump with the height of insect activity, and in the most glorious weather of the year, the sun blazing through a breathless atmosphere, the number and

variety of guests swarming to the feast were almost beyond belief. Sometimes an altercation would arise, when some blundering glutton (like *Bombus* or *Trichius*) tried to elbow his way into a blossom where there was no longer standing room. But "with them," as Wordsworth points out, "no strife can last."

"For why?—because the good old rule

"Sufficeth them—the ancient plan

"That they should get who have the power

"And they should keep who can,"

—and the weakest go to the wall.

Among the many new species we met with in these happy hunting-grounds were several members of the group *Clyti*, between the *Cyllenes* and the *Anaglypti*; of this group we found an occasional specimen of *Xylotrechus colonus*, and a small *Neoclytus*, while *Clytanthus ruricola* was abundant. In the Lepturoid group we took many specimens of a genus we had not found at all before, *Typocerus*, of which we met with three distinct species, one black (*T. lugubris*), one black and yellow, banded like a wasp (*T. sparsus*), and a third mottled with patches of straw-colour and reddish-brown (*T. velutinus*).

In midsummer heat insects seem to grow nervously alert and restless, and we found the *Typocerus* often defied capture; they would hover at a blossom without settling, like miniature humming birds, their tiny wings fanning with marvellous velocity, while their flight from one point to another was of the swiftest. A small beetle in flight is never conspicuous, and some of them when they settle on a blossom seem to have stepped out of the infinite, and when they take to flight again they pass away into a 4th dimension, as though, like Wordsworth's skylark, they too enjoyed a "privacy of glorious light," but one that needed no soaring to gain. More than once we found with birds of this feather that one in the hand was by no means worth two in the bush; there proved many a slip between the cup of one's closed fist and the lip of the cyanide bottle.

To the Lepturas themselves, already a long list, we added *L. subhamata*, *zebra*, *vagans*, *proxima*, *biforis*, *vittata*, *Canadensis*, and three species, at least, unidentified. Of these, *proxima* and *subhamata* seem to prefer the elder, and *Canadensis* the milkweed. In the same neighbourhood, from the heart of a dogrose I flushed an *Obera bimaculata*, and from plants of the wild bergamot, with its sweet fragrance and delicate lavender blossoms, a whole covey of some smaller *Obera* that I have not yet identified. I say "flushed" advisedly, for in the first instance I did not

bag my bird ; indeed, I chased it for two years before I caught it (the species, that is, not the individual). It is a small insect, of very narrow outline, and black in colour ; when flying it is almost invisible, only the practised eye can make out a minute and swiftly-moving shadow. You will get some idea of the hunter's difficulties when I say that I found it fatal to wink the eye while marking its flight ; the creature simply disappeared like the skylark at the last point of vision. For one thing, it has a dodging flight, like that of a snipe, and to make its assurance of escape doubly sure it never settles on the upper side of a leaf, but always underneath. Even then it is seldom off its guard ; if you cast so much as a shadow, it is off like a trout in a pool. I tell you there was rejoicing in the camp, if not feasting, when I came home with the scalp of *Oberia bimaculata* at my belt.

But in so fair a scene as the Port Hope Rocky Mountains, disappointments cast but a passing shadow. The place was a perfect Paradise of flowers, and as we wandered in sunshine beneath the vaulted blue, over beds of New Jersey tea, through thickets of raspberry and thimbleberry, among brackens and orange lilies, by fences festooned with grapevine and smothered in dogrose, everywhere a riot of blossom and insect life—Nature transfigured with the glory of the July sun, we thought of the wonderful interdependence of all living things on earth, and felt—I hope I may say it without irreverence—that it was good to be there.

“ Such life there, through such lengths of hours,

“ Such miracles performed in play,

“ Such primal naked forms of flowers,

“ Such letting Nature have her way

“ While Heaven looks from its towers !”

THE FAMILY NAME LYGÆIDÆ.

Dr. Bergroth (CAN. ENTOM., Nov., p. 405) seems to think that Mr. Kirkaldy has shown that *Lygeus* is a Coreid. I do not consider that he has shown it at all. Kirkaldy states in the “ENTOMOLOGIST,” 1899 and 1900, that Fabricius, in 1794, fixed the types of *Lygeus*, *Coreus*, etc. Fabricius does not fix nor indicate any types whatever in these genera, all containing many species. No type was indicated until 1801, when Lamarck, *Système Anim.*, p. 294, says : “Corps oblong, un peu étroit (Ligæi, Fabr.). *Cimex equestris*, Lin. *Ligæus equestris*, Fab.” *Equestris* was an originally-included species, and therefore is the type. This leaves *Lygeus* as it is in the Leth. and Severin Catalogue.—N. BANKS.

PHYLOGENY OF THE LITHOCOLLETID GROUP.

(Preliminary Survey.)

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Of the descent of this group—*Cremastobombycia*, Braun; *Lithocolletis*, Hbn. (*Phyllonorycter*, Hbn.); *Cameraria*, Chapman; *Porphyrosela*, Braun—from Gracilariad ancestry there seems to be no question, but the exact phylogenetic relationship of the constituent members remains in some doubt. Especially so is this true of the group possessing abnormally flattened larvæ, *Cameraria*, Chapman, a remarkably homogeneous complex of species, both in larval and imaginal structure and in type of markings.

In order to understand the basis of some of the recently proposed theories of the descent of this group, it is necessary to review briefly some of the details of structure in the early larval stages upon which such classification rests. The principal structural larval character possessed in common by their Gracilariad ancestor and by the groups assumed to be descended from it, is that all have at least two so-called Gracilarian instars. The first two in *Gracilaria* and the first three in the Lithocolletid group are of this character. Dr. T. A. Chapman, in his admirable paper entitled "The Classification of Gracilaria and Allied Genera" (THE ENTOMOLOGIST, 1902, pp. 81-88, pp. 138-142, pp. 159-164), has discussed the significance of this character as showing the descent of these genera from Gracilariad ancestry, and as a taxonomic character, where it is extended into the third instar, as is the case in *Cremastobombycia*, *Lithocolletis* (typical), *Porphyrosela*, and as he supposed, erroneously, however, into the fourth and fifth instars of the flat-larval group. It is just with regard to this point that errors in the observations of previous workers, notably Chambers (Jn. Cin. Soc. Nat. Hist., II, pp. 79-93, 1879), have resulted in the flat larva being regarded as more widely divergent from the ordinary form in the latter instars than is actually the case. The true Gracilarian larva, as it exists in the first three instars, possesses unusually large labrum and labium with but very rudimentary labial palpi, flattened mandibles, able to cut only the substance of the leaf directly in front of them, and no maxillæ that can be detected, except as represented by indistinct lines on the mandibles. With the third moult of the so-called cylindrical larva, the *structure* and *form* change to the normal type, with all the mouth-parts present. This change in *structure* occurs with the third moult in the flat group also, but the flattened *form* persists, and the

larva continues to feed, as in the first three stages, by separating the epidermis and increasing the extent of the mine. A comparison of the lower figure, which represents the head of a flat larva in the fifth instar,

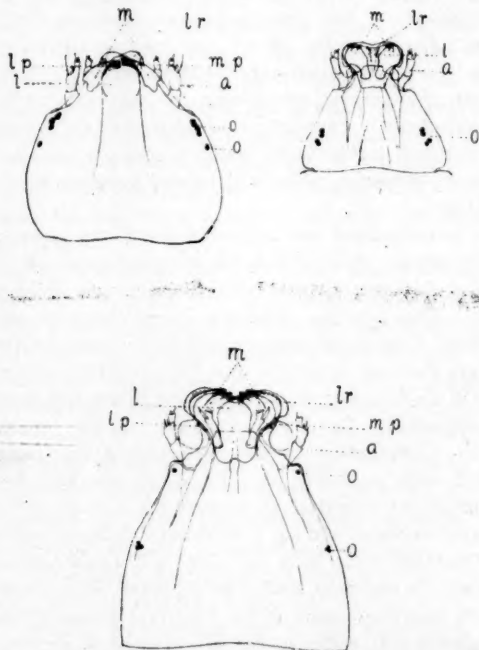


FIG. 12.—Upper left hand: Head of cylindrical larva. Upper right hand: Head in Gracilarian stage. Lower figure: Head of flat larva (lr labrum; m mandibles; m. p. maxilla and maxillary palpus; l labium; l. p. labial palpus; a antenna; o ocelli).

with the upper ones, the left of which represents the head of a larva of the cylindrical group in the later stages, the right that of a typical Gracilarian stage (third instar) of one of the cylindrical group, will show that there is a greater structural difference between the fourth and fifth instars of the flat larva and the true Gracilarian instar than there is between the flat larva and the ordinary cylindrical larva, where the difference is more quantitative than qualitative. The fact that maxillæ and maxillary palpi

are plainly present in the fourth and fifth instars of the flat larva shows that these are *not* *Gracilarian* instars.

However, even conceding that there is no great structural difference between the types of larvæ, the very appreciable modification of form in the fourth and fifth instars and the non-functional character of the mouth-parts in the sixth and seventh instars of the flat group still await explanation. Remembering that the imagoes of *Lithocolletis* (typical) and *Cameraria* are structurally identical, the question resolves itself into a consideration of how much reliance should be placed upon these larval characters in determining the phylogeny. It is true that in the absence of imaginal characters, larval characters may furnish a basis of classification, but before accepting the testimony they afford as final, we should examine them critically to determine whether they represent the phylogenetic divergence of the group or are merely cenogenetic larval modifications adapting that group to different life conditions.

A phylogenetic tree which shows the independent origin and parallel descent of two groups, distinguished by the larva of one being flattened, the other cylindrical, must be based on the assumption that, e. g., those characterized by a flattened larva are descended from genera or groups, now extinct, which possessed this characteristic. This line of reasoning rests on the hypothesis, which has repeatedly been shown to be unreliable for free-living larval forms,* that the individual recapitulates in its ontogeny, the history of the race. This, it seems to me, is the fundamental weak point in such a phylogenetic tree as that proposed for the group under discussion by Mr August Busck (Proc. Ent. Soc. Wash., XI, 100, 1909). On the other hand, we are justified in concluding that the common possession of at least two *Gracilarian* instars is proof, additional to that furnished by the imagoes, of the common descent of the group from *Graciliariad* ancestry, because this characteristic has been handed down through so many modifications of imaginal structure and environmental conditions that it may well be assumed to be conservative. In the flat-larval group, we have no such basis of comparison to determine whether the later two flattened stages constitute such a conservative character or not, and hence can not accept the evidence afforded by the ontogeny.

If the flattened form of the larva in the fourth and fifth instars and the slight modification of mouth-parts in the sixth and seventh instars,

*See Montgomery, "The Analysis of Racial Descent in Animals."

where they are not functional for feeding, are not phylogenetic characters, what explanation is there of their structure? This is manifestly adaptive, and this view is supported by the following arguments:

1. There is an obvious advantage in the flattened and projecting labrum as an aid in separating the epidermis combined with the undoubted specialization of the mandibles, which, however, is not as extreme as in a true Gracilarian instar.

2. This specialization is correlated with the mode of life, and ceases when the mode of feeding which produced it comes to an end. The animal kingdom affords us abundant instances of species which undoubtedly are closely related within the same genus, one of which possesses a specialized larval form not present in the other, which is correlated with different larval habits.

3. The period of wrinkling the loosened epidermis by means of the silk spun across it, which takes place in the cylindrical group in the fourth instar, takes place in this group in the sixth instar, after the period of feeding has passed, which may account for the partial degeneration of the mouth-parts in the sixth and seventh instars. Why there should be two instars of the character of the sixth, remains to be explained, but it may be suggested that these may be periods of development, in which the larva approaches the normal form.

More important than these, perhaps, are the structural gradations which are disclosed by the examination of larvæ of species of the cylindrical-larval group, which in larval habits and type of markings approach the flat-larval group. This feature will be discussed in a future paper.

Are the differences sufficient to constitute a division of generic rank, which has originated early from Gracilariad stock? Have we not here to deal with a group in the process of differentiation, rather than a genus already formed and isolated, since it is by adaptation and the *resulting* change of structure that the group will finally be isolated?

That the flat-larval group is, it seems to me, a more recent development than the typical *Lithocolletis*, is shown by its restricted geographical range (compared with that of the typical *Lithocolletis*), and the comparatively slight variation in the marking, together with their remarkable resemblance to the type of markings characteristic of *Cremastobombycia*. In determining the descent, two possibilities present themselves. The first is that *Lithocolletis* (typical) is an earlier offshoot from *Cremastobombycia*, either from stock somewhat different from the modern

Cremastobombicia, or if from an ancestral *Cremastobombicia*, resembling those now in existence, the connecting links have to a greater or less extent been lost. The second possibility is that the flat and the cylindrical-larval groups have descended in diverging directions from a common ancestor, an offshoot of *Cremastobombicia*. These two paths of evolution may be illustrated diagrammatically thus (Fig. 13):

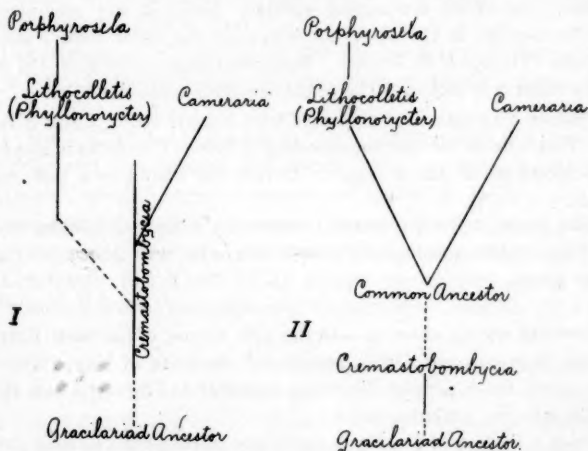


FIG. 13.—Phylogeny of the Lithocolletid Group.

Either of these two views indicates a close relationship between the two groups; if the second should prove the correct one, *Lithocolletis* (typical) and *Cameraria* should certainly not be separated generically. At the present stage of the investigation the evidence connecting the flat-larval group with *Cremastobombicia* is somewhat more complete than that connecting *Lithocolletis* (typical) with either.

NOTE ON SPHINX PERELEGANS, HY. EDWARDS, IN BRITISH COLUMBIA.

BY REV. G. W. TAYLOR AND ARTHUR GIBSON,

For some years the senior author has collected at Wellington, British Columbia, odd specimens of a handsome, large, blackish sphinx, which until a recent visit to Ottawa he had not personally studied. On this

occasion, however, the specific standing of the specimens in question was investigated, and we have now come to the conclusion that the species is *Sphinx perelegans* of Henry Edwards.

With five specimens before us, three of which are in splendid condition, we have carefully gone over the descriptions of *perelegans*, *Vancouverensis*, *Vashti* and *albescens*; the specimens agree perfectly with the description of the first-named species. Four of the specimens are from Wellington, B. C. (6, 7, VI, '03), and the other from Peachland, B. C. (6, VII, '07, J. B. Wallis). Four are males; 3 expand $3\frac{3}{8}$ inches and the other $3\frac{3}{8}$ inches. The female expands 4 inches.

Sphinx perelegans was described from Gilroy, Santa Clara Country, Cal. This note of the species occurring in British Columbia is an addition to the Sphingidæ of that province. In fact, the record is a new one for Canada.

The insect is by no means common in British Columbia, and not more than a dozen specimens are known to have been taken during the last 10 years.

APHIDES ON GLADIOLUS.—In the 24th Report of the State Entomologist on Injurious and Other Insects of the State of New York, 1908, pages 19-22, Dr. E. P. Felt discusses, describes and figures a new species of *Aphis* affecting gladiolus bulbs.

From a reading of Dr. Felt's paper one might be led to infer that the occurrence of aphides on bulbs of gladiolus had been observed but recently. I think it was in the spring of 1894 that I observed an aphid in considerable abundance infesting gladiolus bulbs offered for sale by florists in Cleveland, Ohio. Not being able to obtain winged adults, the fact of this occurrence was never published. On July 21, 1894, aphides were found upon the leaves of the growing plants, and an attempt was again made to secure winged adults for identification, but resulted only in another failure. From this material, however, a Hymenopterous parasite was reared on Aug. 8th of the same year, which was determined by the late Dr. Ashmead as *Praon Coloradensis*, Ashm. (See 13th Ann. Rep. Ohio Agr. Exp. Sta., 1894, p. 39.) It is, of course, impossible to say that either of these aphides belonged to the species just described by Dr. Felt, although the one on the bulbs might quite likely have been identical; but the observations are now placed on record as showing that the occurrence of aphides on these beautiful flower-plants is by no means recent.—F. M. WEBSTER, Bureau of Entomology, Washington, D. C.

THE EUPITHECIÆ OF EASTERN NORTH AMERICA.

No. 3.

BY GEO. W. TAYLOR, NANAIMO, B. C.

Since I began my paper on the Eupitheciæ of Eastern North America (the completion of which has been delayed by my continued illness), much attention has been given to the group by our students of Geometridæ, now quite numerous.

In consequence of their studies and my own further investigations, I have to amend some of the statements made in the earlier parts of this paper.

I have now good specimens of *scriptaria*, H.-Sch., *gelidata*, Moeschler, and *hyperboreata*, Staudinger. They appear to me to be distinct species, and not any of them to be referred to *E. nanata*.

Coagulata, Guénee, is the name I retained for the form represented by the ♂ type of Packard's *geminata* (Monograph pl. VIII, fig. 2), and Mr. Grossbeck (Ent. News, XVIII, p. 347), agrees with me as to this. Mr. Pearsall, however, has redescribed the form as *E. meritata* (Ent. News, XIX, p. 195).

With regard to *E. miserulata*, Grote, several articles have lately been written, and from them it appears that Messrs. Grossbeck, Pearsall and Swett are all agreed to give the name to a part of Hulst's *E. nebulosa*.

I had come to the conclusion that a quite different insect (since named *Swettii* by Mr. Grossbeck) was the one from which at least a part of Grote's description was drawn. I still feel quite confident that I am right, but as I am also sure that the description being poor and probably drawn up from several "types" not conspecific, and all the types being lost, it will never be possible for my position or Mr. Grossbeck's to be absolutely proved. No dependence can be placed on a supposed type "entirely without label," nor can we rely on specimens named by Grote for various collectors, as he admitted that *all* his eastern Eupitheciæ stood under the one name. I am therefore content that in this case the majority shall rule, and henceforth I shall call the form indicated by Messrs. Grossbeck and Pearsall (= *nebulosa*, Hulst, pars, = *Grossbeckiata*, Swett), *miserulata*, Grote, and the form I had identified as *miserulata* will stand as *Swettii*, Grossbeck.

E. luteata, Packard.—Never having seen Packard's types, I naturally accepted Packard's own statement that *luteata* and *palpata* constituted but

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one species. I was confirmed in this view by Mr. Swett, who assured me that he had compared the types.

However, as Mr. Swett now says that the two species as represented in the Packard collection are quite distinct, and Mr. Grossbeck, who has also studied the types (Ent. News, XVIII, p. 344), agrees with him, I suppose we must retain both names on our lists.

E. implicata, Walker.—It appears that the type specimen of this species, which has been re-examined for me by Mr. Prout, is not the same as *anticaria*, Walker. It is a form very nearly allied to *E. latipennis*, Hulst, but for the present I hesitate to unite the two.

I have now to deal with the species described by Mr. Hulst. They are only five in number :

1896. <i>nebulosa</i> .	1898. <i>latipennis</i> .
1896. <i>inornata</i> .	1900. <i>plumbaria</i> .
1896. <i>fumosa</i> .	

(It will be noted that an interval of 20 years separates Packard's latest and Hulst's earliest descriptions.)

With regard to *nebulosa*. I have always considered that the Texan types—there is one of them in the U. S. National Museum—more nearly agreed with Hulst's description than the New York and New Jersey types which are still in the Hulst collection. I have therefore retained Hulst's name, *nebulosa*, for these Texan specimens in my own collection. Those who think that this form is the same as the Atlantic Coast form will, of course, place both together under the name *miserulata*.

The type of Hulst's next species, *inornata*, has been shown by Mr. Pearsall (CAN. ENT., XXXIX, p. 143), to be a worn specimen of *Euchaeca perlineata*, Packard, and the name will therefore be dropped from our lists.

Fumosa, Hulst, is discussed by Mr. Grossbeck (Ent. News, XVIII, p. 348), and is apparently a good species of the *absinthiata* group. If I have rightly identified it, I have it from Ottawa and Montreal.

Latipennis is a good species, and one of the commonest (in Canada ranging from Quebec to Winnipeg). It was originally described from a specimen taken at Quebec by Mr. Hanham, and through the generosity of that gentleman this type is in my collection. How Mr. Hulst came subsequently to confuse this species with *E. albicapitata* is more than I

can say, but according to Mr. Grossbeck (Ent. News, XVIII, p. 347), this is what he did.

Latipennis is nearly allied to *E. castigata*, which replaces it in the west, and also to *E. implicata*, Walker, with which, as I have said above, it may be identical.

The last of Hulst's species is *E. plumbaria* (CAN. ENT., XXXII, p. 102). This is very inadequately described. The type, however (taken in the District of Columbia, July 5), is still in the U. S. National Museum, and is in fair condition. It is a small species of the group of *E. Frostiata* and *E. conformata*, but I have not been able to match it with any specimens in my own collection. This group is either made up of a number of nearly allied species or of one very variable one. My material is not sufficiently large to enable me to determine this point to my satisfaction.

Since the publication of Dyar's List 13 additional species have been described from eastern localities.

In order of publication these are :

- | | |
|-----------------------------|------------------------------|
| 1906. Youngata, Taylor. | 1908. filmata, Pearsall. |
| 1907. Fletcherata, Taylor. | 1908. Catskillata, Pearsall. |
| 1907. Swettii, Grossbeck. | 1908. erpata, Pearsall. |
| 1907. Taylorata, Swett. | 1908. meritata, Pearsall. |
| 1907. Frostiata, Swett. | 1908. Russellata, Swett. |
| 1907. Grossbeckiata, Swett. | 1908. Brauneata, Swett. |
| 1908. conformata, Pearsall. | |

The first three are good species and very distinct, *Taylorata*, *Catskillata* and *Brauneata* I have so far failed to indentify among the forms in my collection.

Grossbeckiata is a redescription of *nebulosa*, Hulst (part), and therefore sinks to *miserulata*, Grote. *Frostiata* is a good species, but *conformata* and *Russellata* are evidently, from the descriptions, very near to it, though I would hesitate to unite them without actual comparison of the types. *Filmata* is a very distinct form, well characterized by Mr. Pearsall. On the other hand, *meritata* is the same as *coagulata*, Guénee, as represented by Packard's smaller ♂ type of *geminata* and *erpata*, seems to me very close indeed to *palpata*, Packard, but here again I am judging merely by the published descriptions, not having seen the types. It now remains for me to make some additions to our lengthening list.

In the first place there are two European species that I think can now be credited to our fauna.

One of these is *Eupithecia togata*, Hubner. This name has already appeared in the check list of British Columbian Lepidoptera on the strength of specimens taken by me at Victoria and Wellington, but I have lately seen specimens from Digby, Nova Scotia (John Russell), and one was also taken by Mr. Prout near Quebec on the occasion of his visit to this country two years ago, so that it can now take its place on the eastern lists also.

E. togata is like a very large *E. albicapitata*, and may be in some collections under this name. This species is said by Hulst (Trans. Am. Ent. Soc., XXIII, p. 272), to be the type of the genus *Eucymatoge*.

The other European species to be added is *E. albipunctata*, Haw. Mr. H. H. Lyman is the discoverer of this form. He bred three specimens from larvæ found near N. W. River, Ungava, in 1905, and very generously gave one of them to me. It is undoubtedly a small specimen, probably dwarfed though insufficient food supply, of the European species. It can be distinguished at a glance from any other of our American species by the way in which the submarginal white line, instead of being continuous, is broken up into spots, the most conspicuous of which are situated between veins one and two, and three and four of both the fore and hind wings.

The descriptions of a number of forms which I suppose to be new are reserved for the next number.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The forty-sixth annual meeting of the Society was held at the Ontario Agricultural College, Guelph, on Thursday and Friday, November 4th and 5th. During the day meetings the chair was taken by the President, Mr. Tennyson D. Jarvis, and at the evening session by Dr. Bethune. Amongst those present were: Messrs. H. H. Lyman and A. F. Winn, Montreal; Dr. C. G. Hewitt and Mr. Arthur Gibson, Central Experimental Farm, Ottawa; Mr. John D. Evans, Trenton; Mr. F. J. A. Morris, Trinity College School, Port Hope; Dr. E. M. Walker and Messrs. C. W. Nash and J. B. Williams, Toronto; Mr. R. C. Treherne, Grimsby; President Creelman, Profs. C. A. Zavitz, H. L. Hutt, R. Harcourt, S. B. McCready, C. J. S. Bethune, Messrs. Jarvis, Howitt, Cæsar, Eastham, Crow, Klinck, of the staff, and a large number of the students of the Ontario Agricultural College and the Macdonald Institute, Guelph.

The proceedings began on Thursday afternoon with the reading of reports by the Directors on the insects observed in their respective

districts during the past season. Mr. Gibson, who represents Ottawa, described the unfavourable character of the season for many insects, but reported Grasshoppers and Aphids as extremely numerous. He also referred to the destruction of a number of cut-leaf birch trees by the Red-necked Borer. Mr. Williams and Mr. Nash gave reports on the Toronto district, and referred to the unsatisfactory nature of the work that is being carried on in order to control the Tussock Moth on the shade trees of the city of Toronto. Mr. L. Cæsar gave a paper on "Some Insects of Economic Importance," referring to the extension of the San José Scale to the county of Prince Edward, the work of a Blackberry Saw-fly, Spruce Gall-louse and a variety of other insects. The papers were discussed in an interesting manner by a number of those present. Mr. Lyman read a paper on "The Origin and Diffusion of Entomological Errors," confining himself to the Lepidoptera. He stated that coloured plates were a frequent source of error, and that occasionally collectors sent their specimens to experts to be named, retaining what they supposed to be duplicates. These were often different species, and it sometimes also happens that the numbers used for identification were transposed, either by the sender or the recipient. The third class of errors was due to typographical mistakes, a number of instances of which he mentioned. Mr. Gibson spoke of the importation of the Brown-tail Moth on French nursery stock in Ontario during the last winter. As soon as their presence became known a thorough examination was made. Over a million plants were inspected, and 186 nests containing living caterpillars were found. These and the packages which contained them were burned, and since then no examples have been found.

In the evening a public meeting was held in Massey Hall Auditorium, which was well filled with students, both male and female, and a number of visitors from the town, as well as members of the Society. Dr. C. Gordon Hewitt, the newly-appointed Entomologist at the Experimental Farms of the Dominion, gave a highly interesting and instructive address, illustrated by a series of admirable lantern pictures, on "House Flies and Their Allies." The College orchestra added much to the enjoyment of the evening by the musical selections they rendered. A very hearty vote of thanks to Dr. Hewitt was moved by President Creelman, and a general feeling of pleasure was expressed that so talented an entomologist had been selected to fill the place of the late lamented Dr. Fletcher.

During the second day, Friday, November 5th, meetings were held during the morning and afternoon in the Entomological Lecture-room, and

were well attended by members and students. The reports of the Council, Officers and Branches of the Society were presented and read. The President, Mr. T. D. Jarvis, read the annual address, in which he especially referred to recent publications and other work accomplished during the past year. A paper by the Rev. Dr. Fyles, of Hull, on "Adaptations in Insect Structure," was read; and a paper on the "Parasitic Work on the Gypsy and Brown-tail Moths in Massachusetts," by Mr. J. D. Tothill, a fourth-year student at the College, who spent last summer in the work at the Laboratory, Melrose Highlands, Mass. In the afternoon the following papers were read: "The Spruce Bud-moth," by Mr. A. Gibson; "Nursery Work in Ontario," by Mr. R. C. Treherne; "The Larch Saw-fly," by Dr. Hewitt; "A New Heliethid from St. Hilaire, P. Q.," by Mr. Winn, who also exhibited an excellent implement for digging out larvæ and pupæ, which consisted of a trenching tool served out to the U. S. soldiers at the time of the Spanish-American war. Dr. Bethune gave an account of some of the insects of the year in Ontario. These papers were discussed by a number of those present. They will be published in full in the forthcoming annual report.

The election of officers for the ensuing year resulted as follows:

President—Tennyson D. Jarvis, B.S.A., Lecturer in Entomology and Zoology, Ontario Agricultural College, Guelph.

Vice-President—Edmund M. Walker, B.A., M.D., Lecturer in Biology, University of Toronto.

Secretary-Treasurer—J. Eaton Howitt, B.S.A., Demonstrator in Botany, O. A. College, Guelph.

Curator—Lawson Cæsar, B.A., B.S.A., Demonstrator in Entomology and Plant Diseases, O. A. College, Guelph.

Librarian—Rev. C. J. S. Bethune, M.A., D.C.L., F.R.S.C., Professor of Entomology and Zoology, O. A. College, Guelph.

Directors: Division No. 1.—Arthur Gibson, Department of Entomology, Central Experimental Farm, Ottawa. Division No. 2.—C. E. Grant, Orillia. Division No. 3.—J. B. Williams, Toronto. Division No. 4.—C. W. Nash, Toronto. Division No. 5. F. J. A. Morris, Port Hope. Division No. 6.—R. S. Hamilton, Collegiate Institute, Galt. Division No. 7.—R. C. Treherne, Grimsby.

Delegate to the Royal Society—Rev. Dr. Fyles, Hull, P. Q.

Auditors—Prof. S. B. McCready and J. W. Crow, B.S.A., O. A. College, Guelph.

A NEW SPECIES OF PTEROMALIDÆ.

BY A. B. GAHAN, ASST. ENTOMOLOGIST, MARYLAND EXPT. STATION.

Forster in 1856 characterized the new genus *Coelopisthia*, (Hymen. Studien. II, 1856, p. 65) using as the type Walker's species, *Pteromalus cephalotes*, described by that author in 1836 from the Isle of Wight (Entom. Mag. III, 1836, p. 481). In 1878, Thomson described another European species, *C. vitripennis* (Hymen. Scandin. V. 1878, p. 16). These constitute all the species of the genus recorded up to the present time. It is my privilege to now describe a third species, the first occurring in North America. It is readily distinguished from those previously described by the large fuliginous spot on the fore wing.

Coelopisthia fumosipennis, n. sp.—Female: Length 2.3 mm. Aeneous. Head broader than the thorax, densely and coarsely punctured; eyes black; scape two-thirds as long as flagellum, yellow; pedicel longer than first two joints of flagellum, yellow; flagellum black. Prothorax, mesothorax except axillæ and scutellum which are shagreened, and metathorax, coarsely and densely punctured, the latter with a distinct median carina. Anterior wings except basal one-third and a broad margin at the apex fuliginous; posterior wings hyaline, iridescent. Legs pale yellow, slightly fuscous at apex of femora; the coxæ are metallic green. Abdomen smooth, shining black with cupreous reflections.

Described from three female specimens reared from Lepidoptera pupa, College Park, Maryland, July 27th, 1908. Two of the type specimens are deposited in the United States National Museum, the third in the collection of the Maryland Experiment Station.

Identified as a new species by Mr. J. C. Crawford, of the United States National Museum, to whom the writer extends his thanks for this as well as many other courtesies.

THE EDWARDS COLLECTION OF BUTTERFLIES.

"A very interesting personal note occurs in the current number of the CANADIAN ENTOMOLOGIST, to the effect that the late Mr. W. H. Edwards, finding himself without the necessary funds to publish the third volume of his 'Butterflies of North America,' contemplated offering his collection of North American butterflies to the Trustees of the British Museum, in order to secure the money to enable him to go on with his work. To prevent the types of his species going out of America, Dr. W. J. Holland offered to pay the bills for the publication of the third

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volume of the 'Butterflies of North America' as they became due, on the condition that the collection should be handed over to him when the studies were completed. This was done, and to-day Edwards's entire collection forms a part of Dr. Holland's own private collection, which is now deposited in the museum of the Carnegie Institute in order that it may be made available with other collections for purposes of study on the part of students.

"Whilst fully appreciating the public spirit of Dr. Holland, it does seem pitiful that the best work ever done by an American lepidopterist was so ill-supported by the entomological public for whom it was written, that the author not only had to give his life's work as a labour of love, but also had to part with his collection, with all its personal and sentimental ties, in order to give to an entomological world a work that it could not even appreciate to the point of paying for the actual mechanical labour expended by printers, lithographers, etc., in its production, an entomological public that took, in addition, without payment, the years of labour spent by the author, in amassing material, breeding and curating the specimens, describing their early stages, etc. Such work is sometimes called, as we have called it above, a labour of love. This may be excellent sentiment, but it appears to us to be amazing nonsense in such a case as this. A labour that ended in Edwards handing over his collection, under the conditions above described, must have sapped his entomological life's blood. No wonder we read in the notices of his death in the American magazines, that, for the last 20 years of his life, Edwards gave up the study of entomology, and took to the study of Shakespearian literature. Dr. Holland's statement allows us now to picture clearly what entomology lost by the failure of individual entomologists to support the best work on lepidoptera that America ever produced. Possibly, at least, two more volumes like the others might have been produced, had they both been supported, and in their place we have a wordy warfare as to how Shakespeare's name ought to be spelt!!"—The Entomologists' Record and Journal of Variation, London, England—October 1909, pp. 239-240.

MEETINGS DURING CHRISTMAS WEEK.

The American Association for the Advancement of Science and the various societies affiliated with it, will meet at Boston, Mass., during the week beginning Dec. 27, 1909. The Association of Economic Entomologists will hold its meetings on the Tuesday and Wednesday, and the Entomological Society of America on the Thursday and Friday of that week. A large attendance is expected.

Mailed December 10th, 1909.

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